RESTRICTED CIRCULATION

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AGRICULTURAL MEMORANDUM NO 700

# Sequences of work days for grass conservation:- West Midlands

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Agric Memo Nos 531 and 574 dealt with sequences of work days in Wales and South West England. Following the interest shown in these, a similar analysis has been made of the sequences of work days in the West Midlands.

The West Midlands like South West England is an area in which grass conservation is of considerable importance, with an extensive dairy industry in Shropshire and Cheshire. The whole region was found to be in a general rain shadow, being protected from the main rain bearing South westerly winds, by the Welsh Mountains.

## DEFINITIONS

A dry day is taken to be one with a rainfall amount not greater than 0.01 inch. A work day is defined as a dry day followed by various numbers of dry days for different methods of conservation. The methods of conservation and their work day requirements are:-

(i) Direct cut silage:- One work day.
(ii) Wilted silage:- One work day followed by one dry day.
(iii) Barn hay:- One work day followed by two dry days.
(iv) Quick hay:- One work day followed by three dry days.
(v) Slow hay:- One work day followed by four dry days.

Since the object of the investigation was to compare the days available for the different methods, the analysis covered the whole season, stated to be mid May to the end of September, although at any particular time through the season any one method might be inappropriate for other reasons. The season was divided up into 14 consecutive 10 day periods from May 15 through to October 1.

It is important to realise that the definition of a work day above gives no conflict in deciding the appropriate allocation to a particular 10 day period when a dry spell extends from one period to the next. Thus consider the following run of days where D represents a dry day and W a wet one.

..... W/DDWWWDDWDD/DDDWWD .....

The count of work days in the 5 classes for the above complete 10 day period is then:-

(i) 6 - number of 1 + 0 work days
(ii) 4 - number of 1 + 1 work days
(iii) 2 - number of 1 + 2 work days
(iv) 2 - number of 1 + 3 work days
(v) 1 - number of 1 + 4 work days

Providing one considers that the decision is made and the work is started on the work day then a proper allocation to the successive 10 day periods can be made, and there is no difficulty in dealing with dry spells which overlap contiguous periods.

## DATA

The basic data used in this analysis were computer printouts of daily (24 hour) rainfall

totals during the summer season (May 15 - Oct 1) for a selection of stations in the West Midlands for the 10 year period 1961 - 1970 inclusive. The data were complete for most stations but for a few stations some were missing. Where this amounted to only one year or part year a 9 year average was taken.

RESULTS

Initially the data from 17 arbitrarily selected stations (Figure 1) were completely analysed, and plots of the overall averages of work days against the average number of dry days were made. Linear regressions were computed to find the best fit straight lines (Figure 3). It was noted that there was little variation in the average number of work days over the region.

Data from a further 11 stations were then analysed and the number of dry days (1 + 0 work days) calculated. The average of these was 5.6 days. There did not appear to be any significant geographical variation to the average number of work days per 10 day period (Figure 2). Isopleths are drawn at 0.5 day intervals. In view of the small variation the distribution was assumed to be uniform over the area.

An investigation was also made into the seasonal variation using the 17 fully analysed stations. Figure 4 shows the average number of work days for each of the 10 day periods for the region over the 10 years. This shows a greater tendency for spells of settled weather in early June, the end of August and mid September.

In addition to the average frequencies of occurrence of work days it is important to have estimates of the number of years in which there is one or more work day per 10 day period. Sixteen of the fully analysed stations were used again, and the average was calculated.

No of years in 10 in which there is one or more work day per 10 day period.

| | 1+0 | 1+1 | 1+2 | 1+3 | 1+4 |
|---|---|---|---|---|---|
| West Midland Regional average | 9.9 | 9.0 | 7.4 | 5.9 | 4.5 |

The seasonal variation in the number of years in 10 in which there is one or more work day per 10 day period was then found and the results are shown in Figure 5. This shows that dry periods suitable for the making of wilted silage (1 work day + 1 dry day) are available in at least 7 years in 10 throughout the season. However, dry periods for making slow hay (1 work day + 4 dry days) are only available for 7 yrs in 10 around the end of May.

An attempt was made to find the frequency of work days for the different methods of conservation expressed as years out of 10. The number of work days for each of the different methods of conservation were extracted from the data with the 10 seasons 1961 to 1970 being divided up into 5 consecutive periods, 4 of 30 days each and 1 of 20 days length. Cumulative frequencies in the form of number of years with 1 or more work days for each method were found. These were plotted against the number of work days for each method in histogram form. (Figures 6 to 10.) Visual interpretation of the graphs will show the number of years out of 10 for which varying numbers of work days may occur.

Any comments or suggestions on this paper should be sent to the author.

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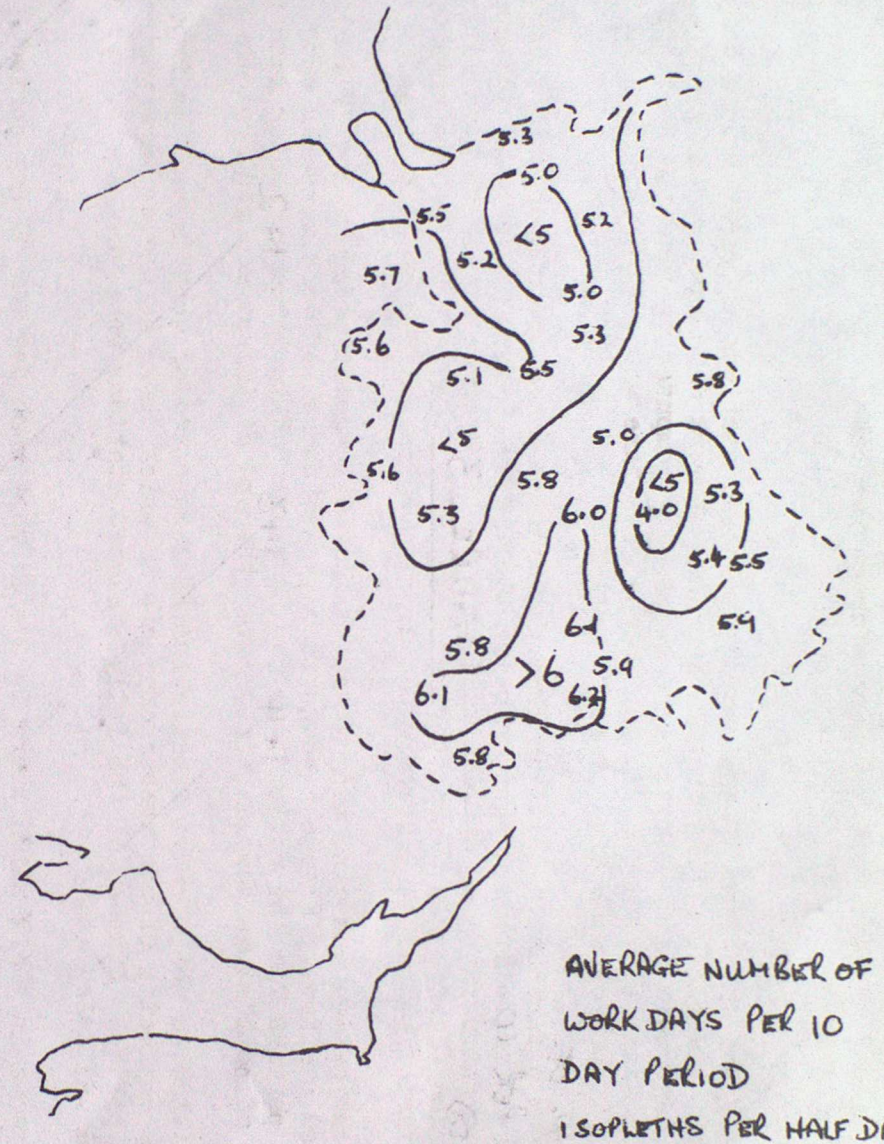
FIGURE 1

X STATIONS FULLY ANALYSED

▲ STATIONS ANALYSED FOR WORK DAYS ONLY

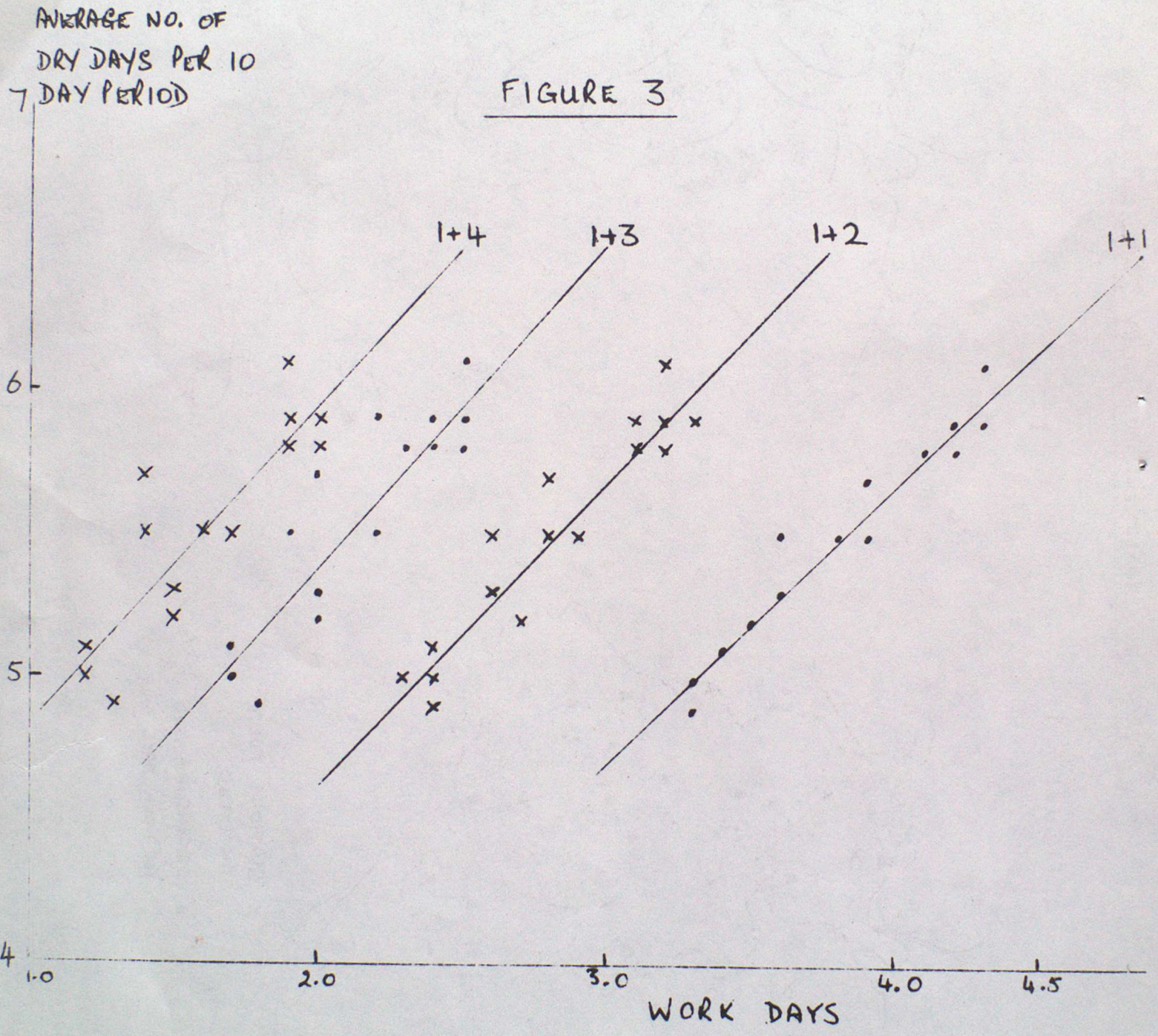
FIGURE 2.



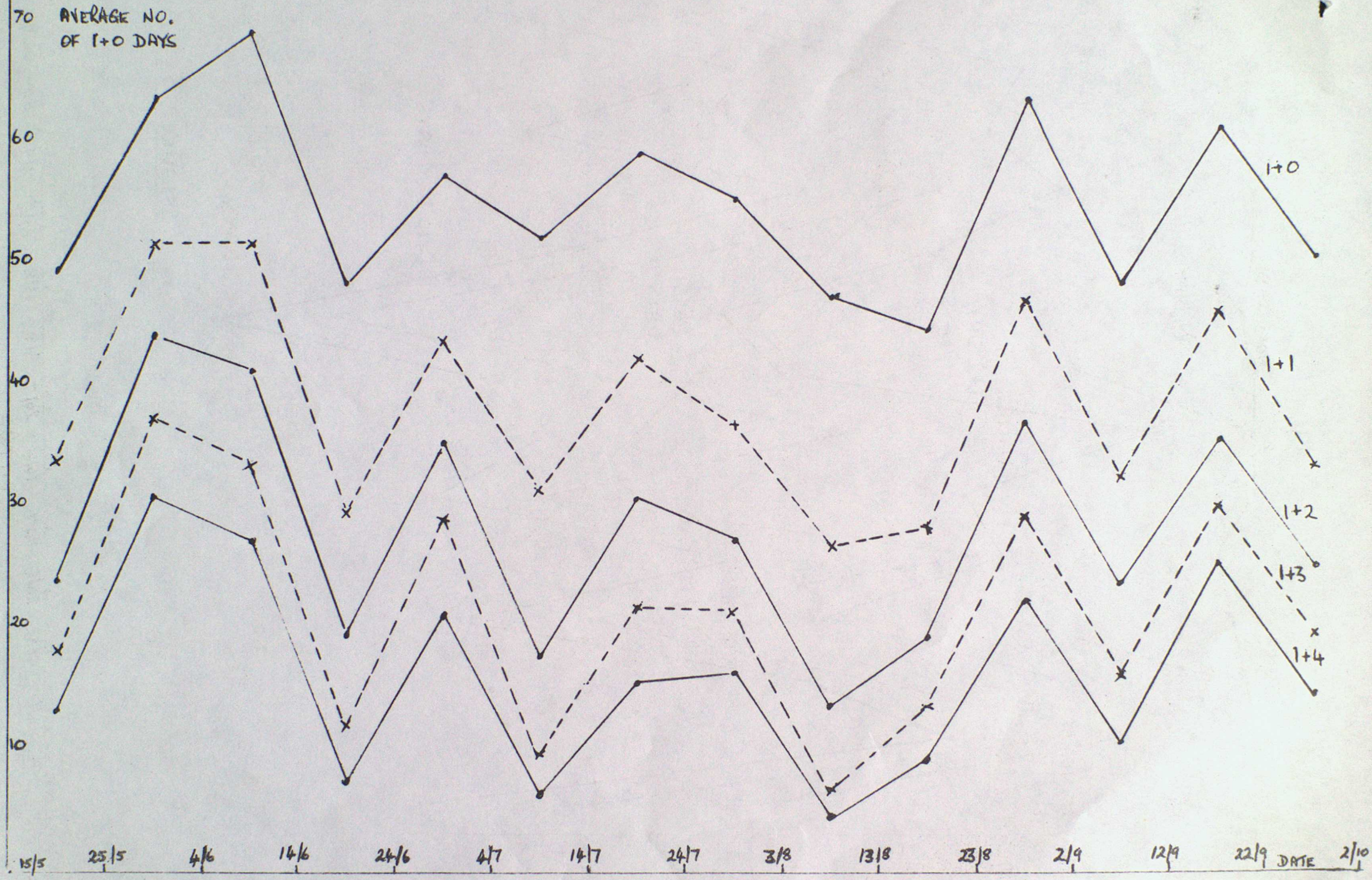

AVERAGE NUMBER OF WORK DAYS PER 10 DAY PERIOD

ISOPLETHS PER HALF DAY

# FIGURE 3


AVERAGE NO. OF
DRY DAYS PER 10
DAY PERIOD
7
6
5
4
1+4
1+3
1+2
1+1
1.0
2.0
3.0
4.0
4.5
WORK DAYS

SEASONAL VARIATION OF WORK DAYS FIGURE 4.



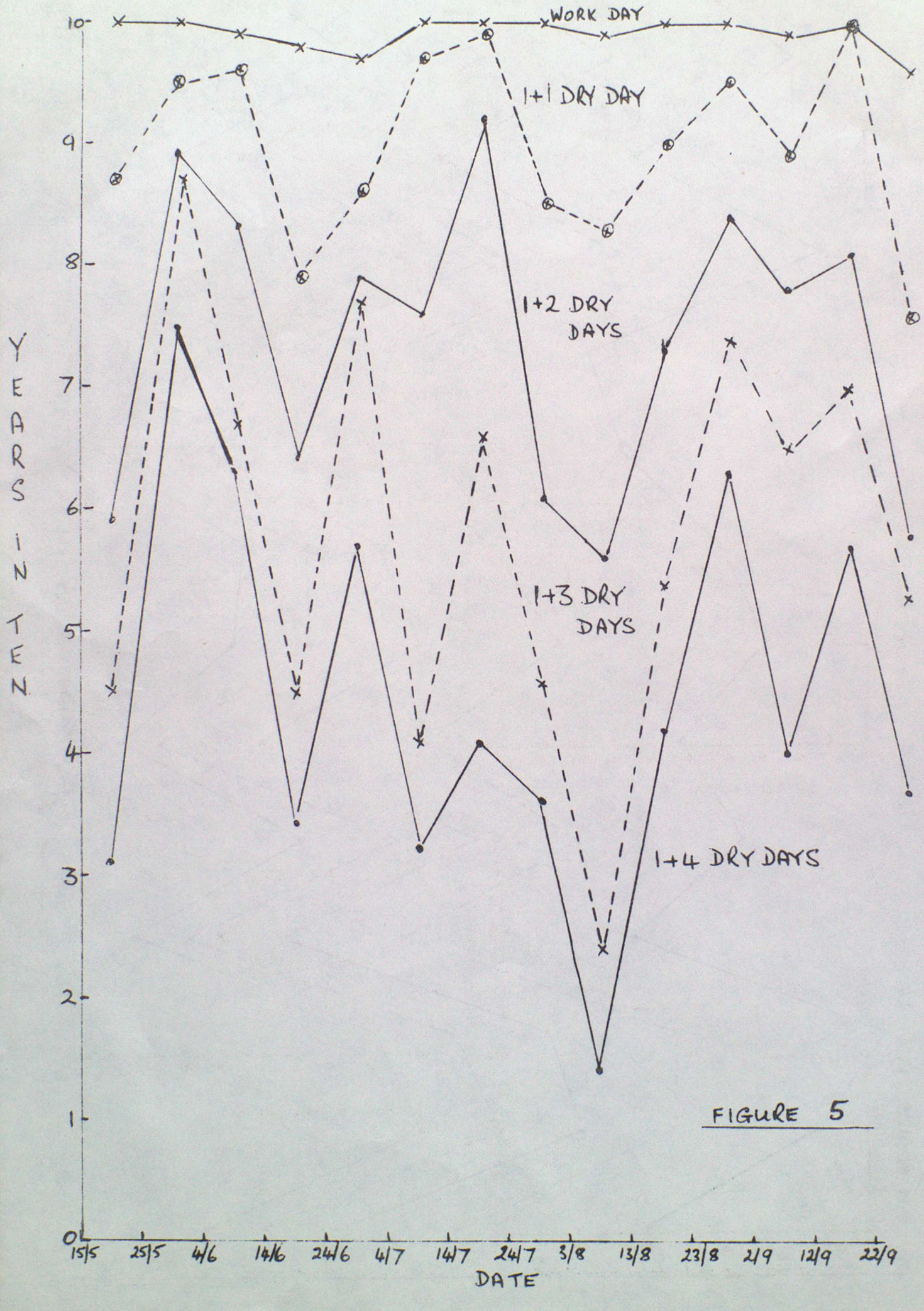
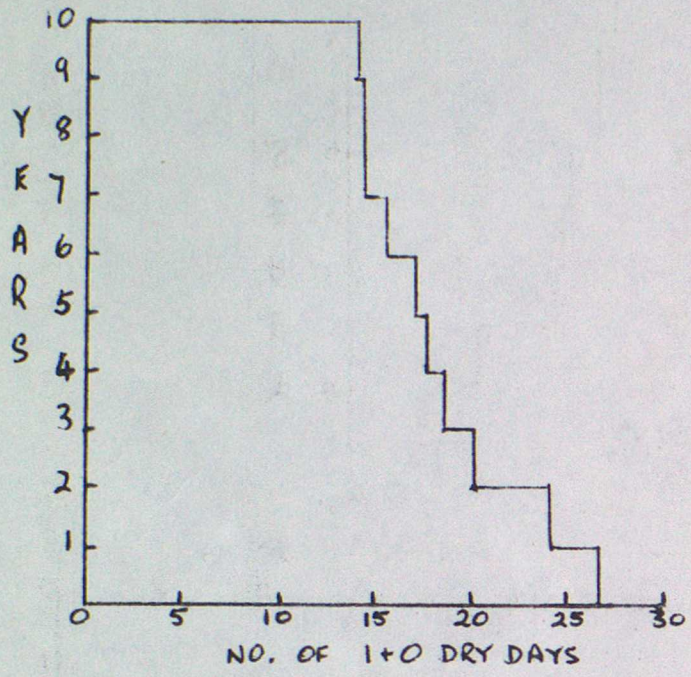

WORK DAY
1+1 DRY DAY
1+2 DRY DAYS
1+3 DRY DAYS
1+4 DRY DAYS
YEARS IN TEN
10
9
8
7
6
5
4
3
2
1
0
15/5
25/5
4/6
14/6
24/6
4/7
14/7
24/7
3/8
13/8
23/8
2/9
12/9
22/9
DATE

FIGURE 5

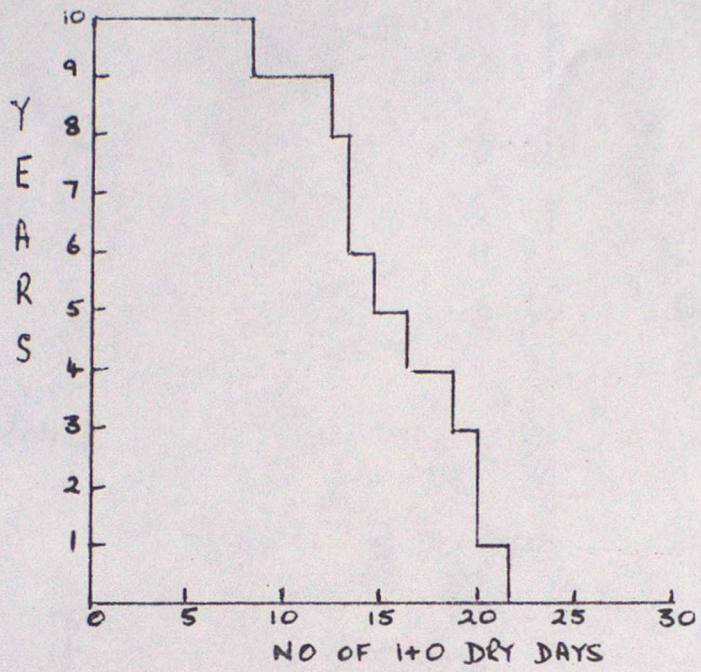
# WORK DAYS (1+0 DRY DAYS)

FIGURE 6

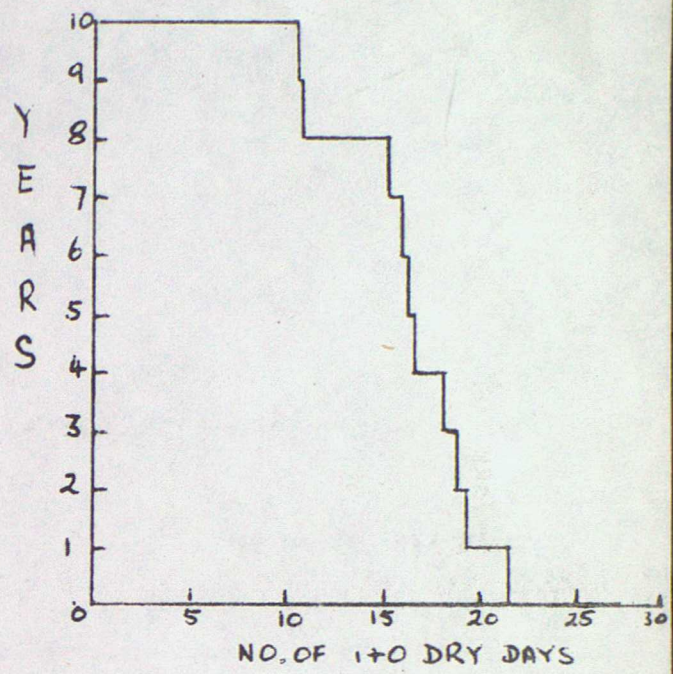
PERIOD 15/5-13/6



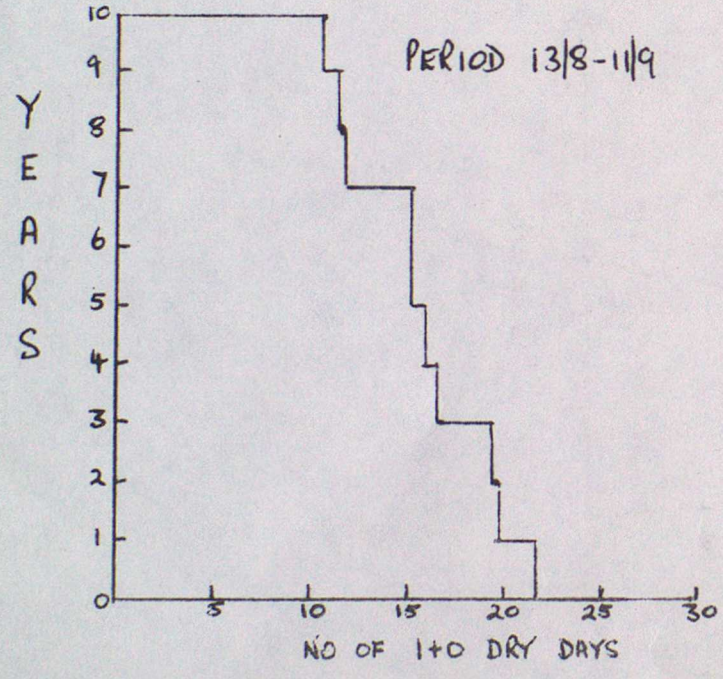

PERIOD 14/6-13/7



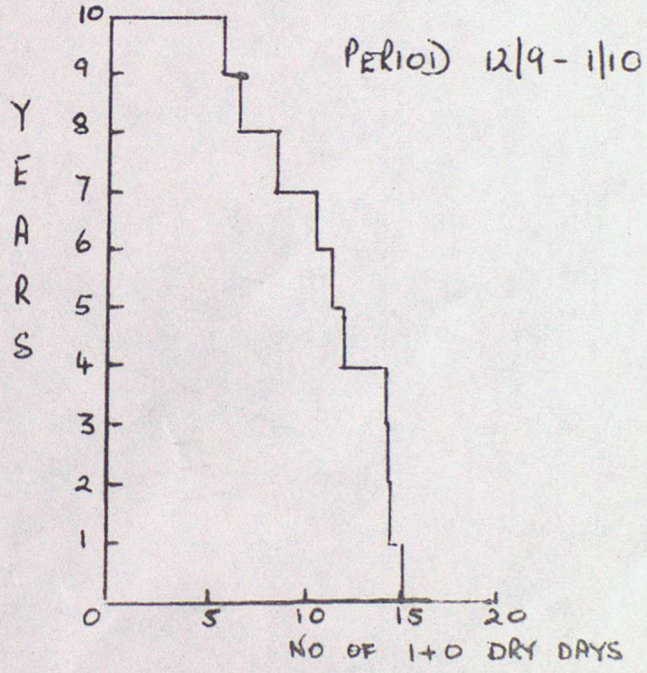

PERIOD 14/7-12/8




PERIOD 13/8-11/9



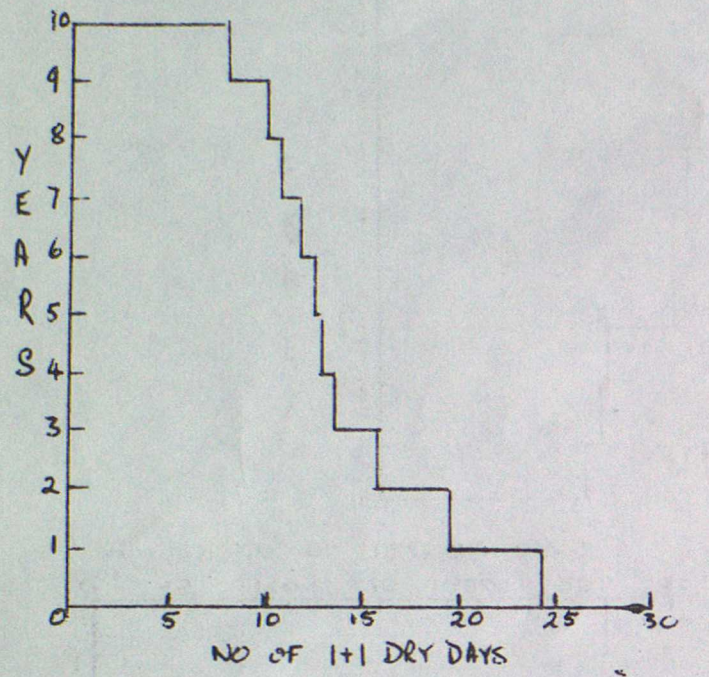

PERIOD 12/9-1/10



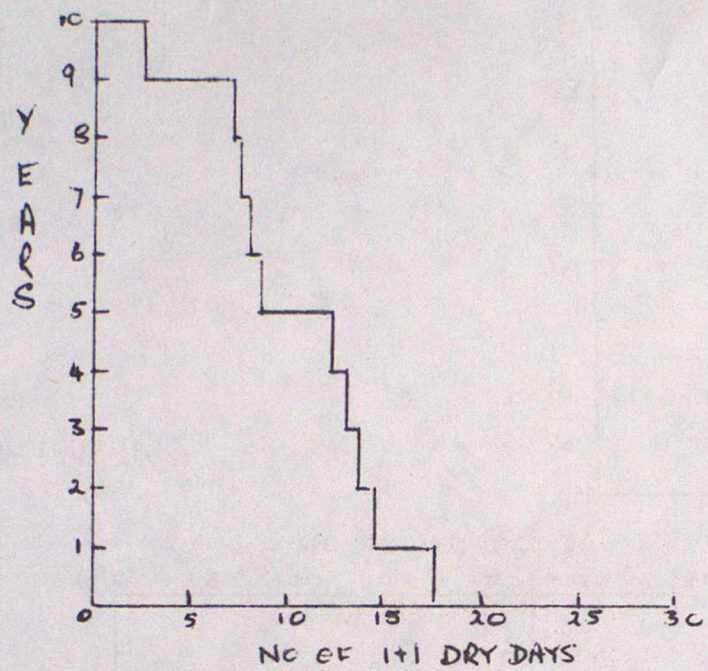
# 1+1 DRY DAY

FIGURE 7

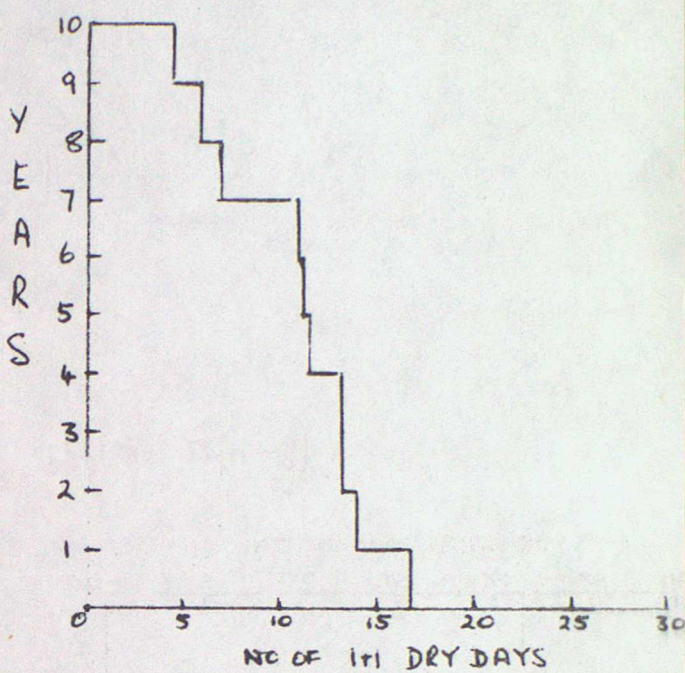
PERIOD 15/5-13/6



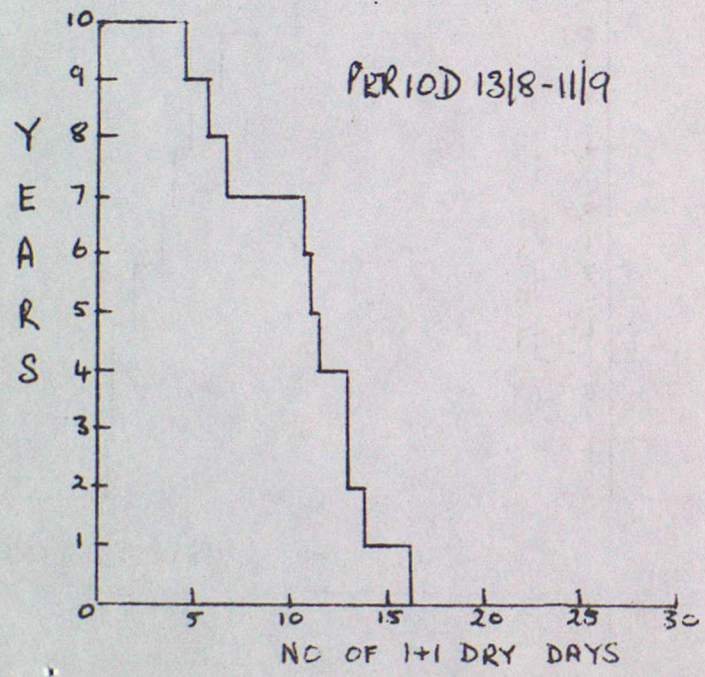

PERIOD 14/6-13/7



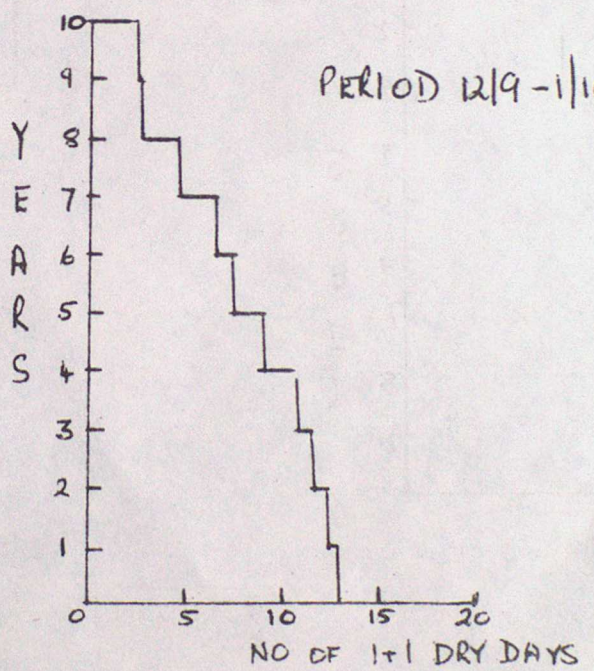

PERIOD 14/7-12/8




PERIOD 13/8-11/9



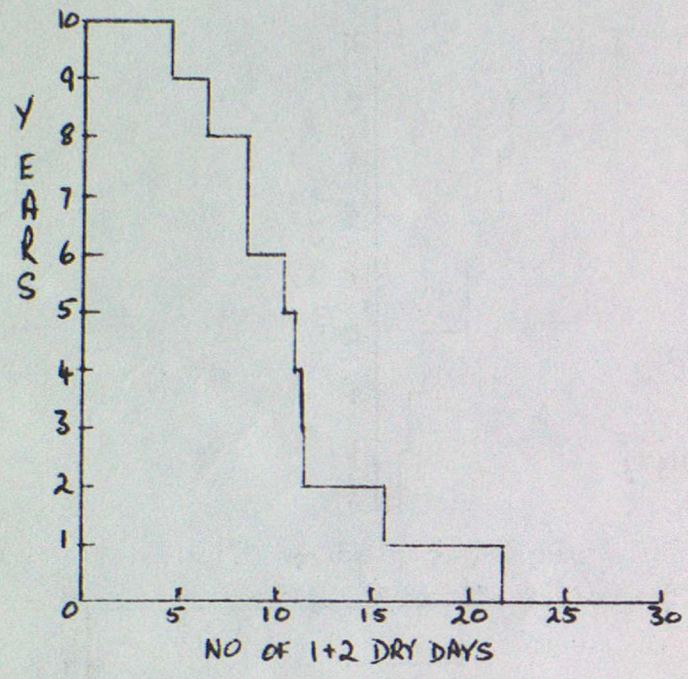

PERIOD 12/9-1/10



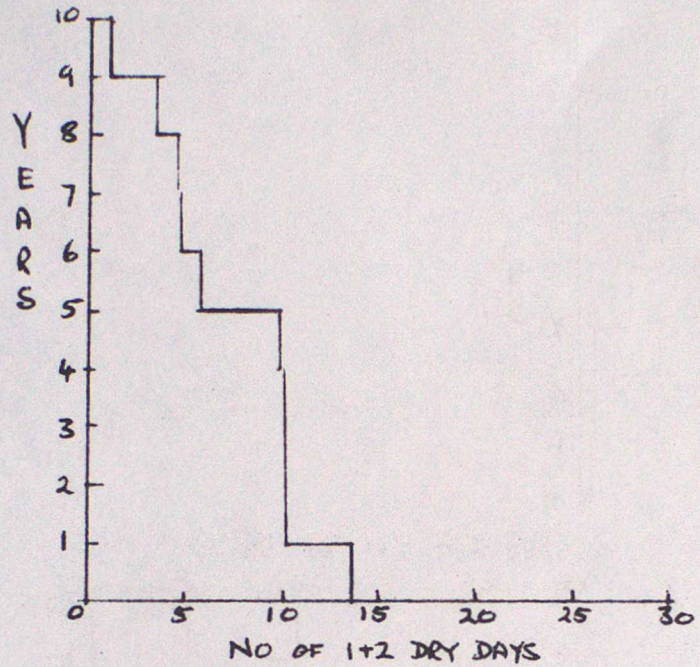
# 1+2 DRY DAYS

FIGURE 8

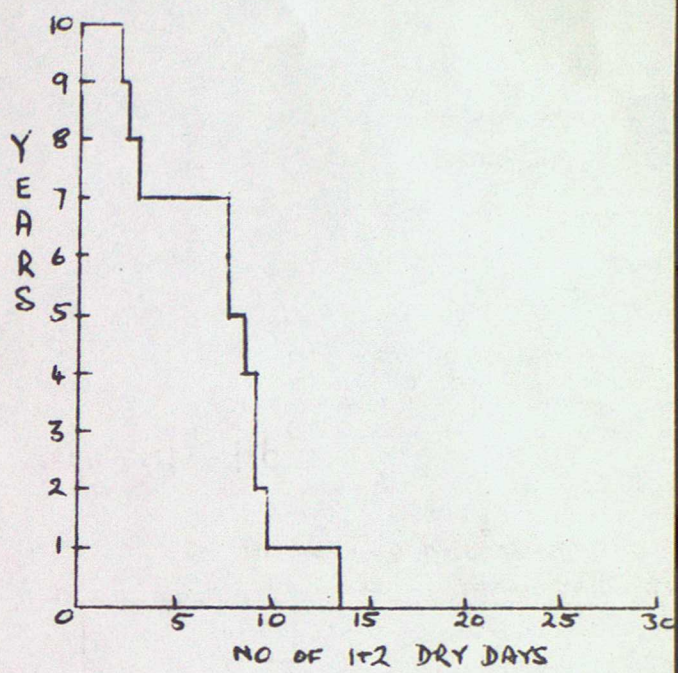
PERIOD 15/5 - 13/6



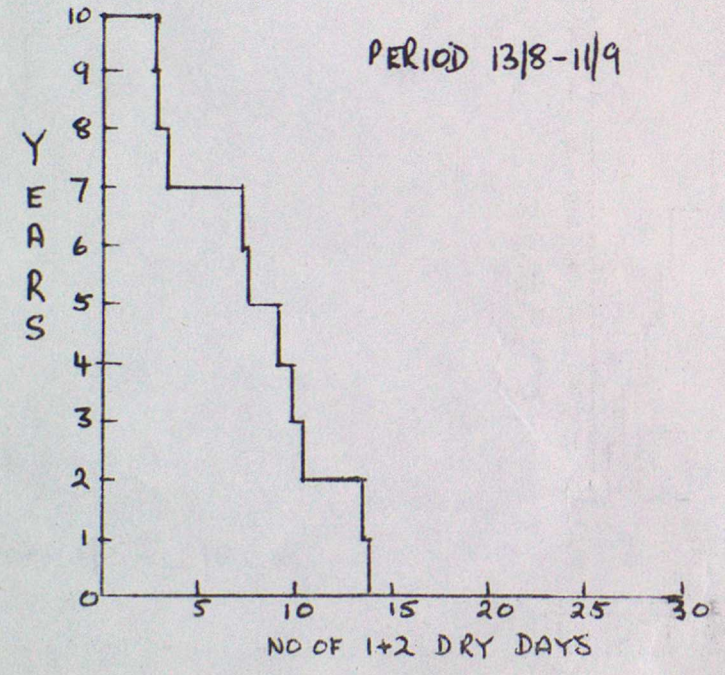

PERIOD 14/6 - 13/7



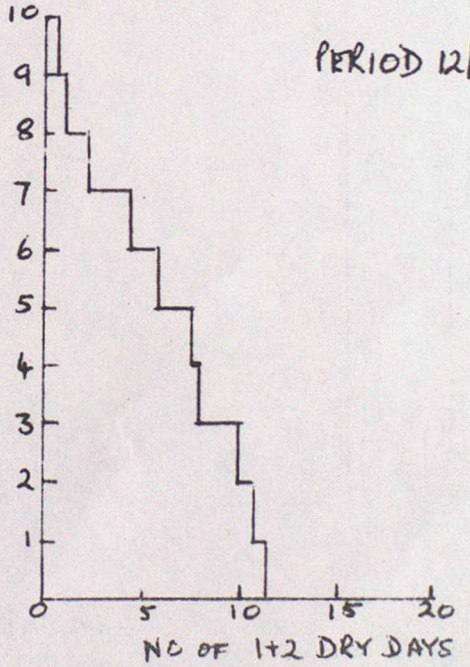

PERIOD 14/7 - 12/8




PERIOD 13/8 - 11/9

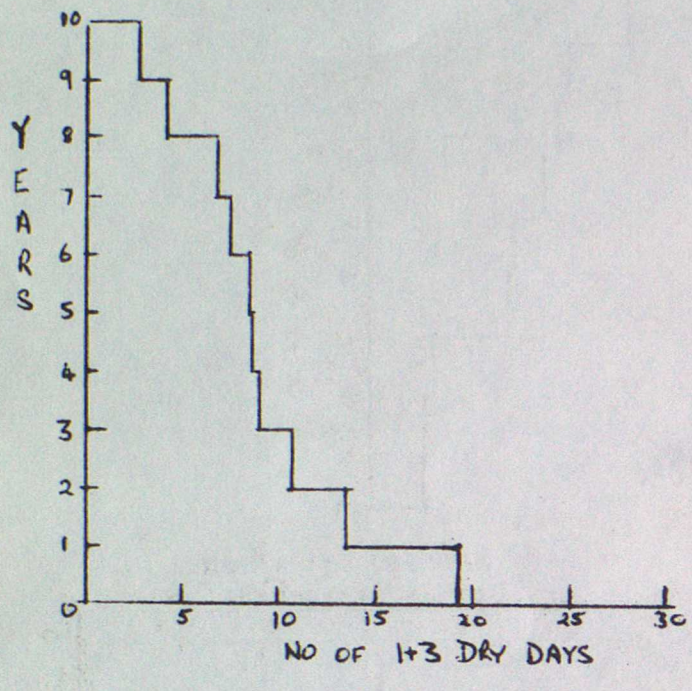



PERIOD 12/9 - 1/10

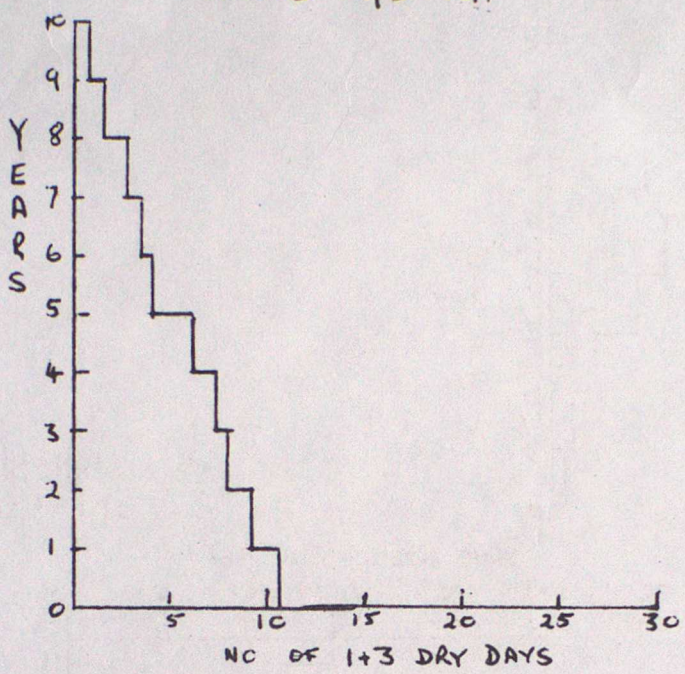


# 1+3 DRY DAYS FIGURE 9

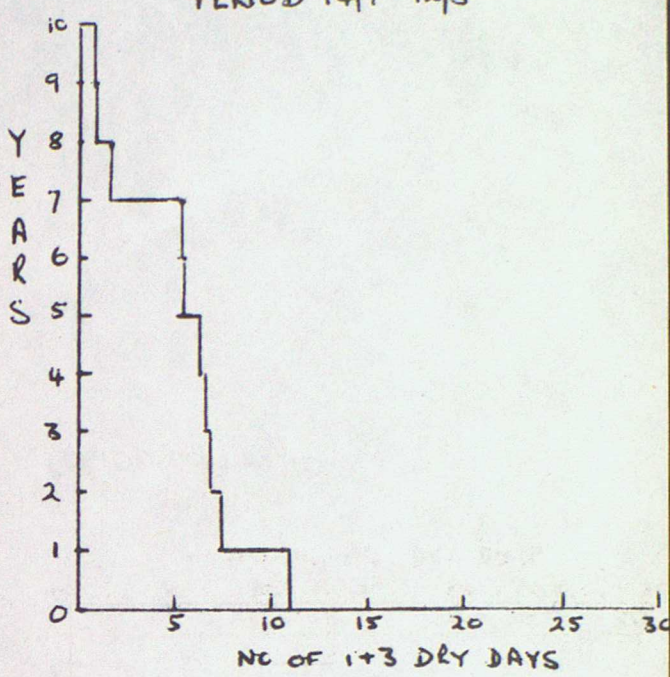
PERIOD 15/5 - 13/6



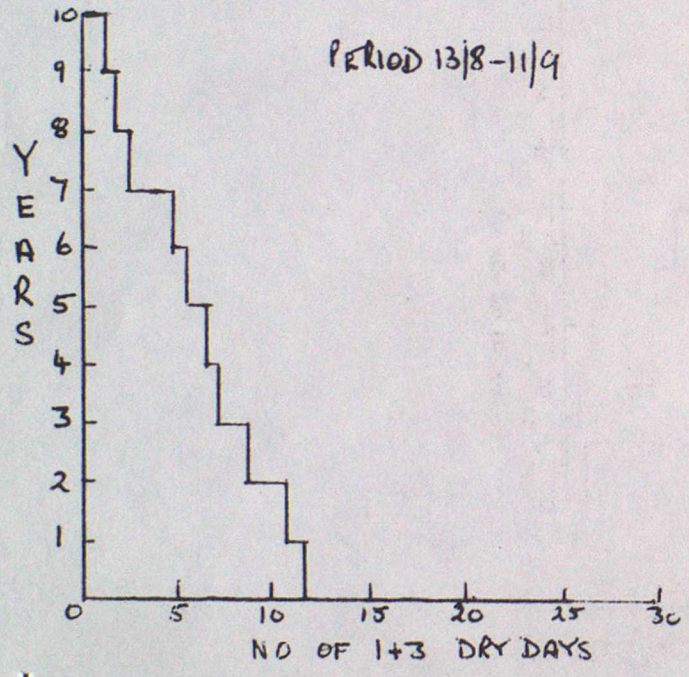

PERIOD 14/6 - 13/7



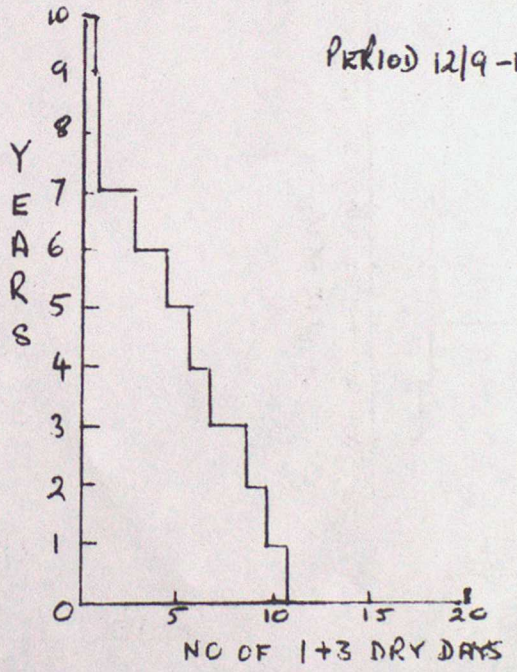

PERIOD 14/7 - 12/8




PERIOD 13/8 - 11/9

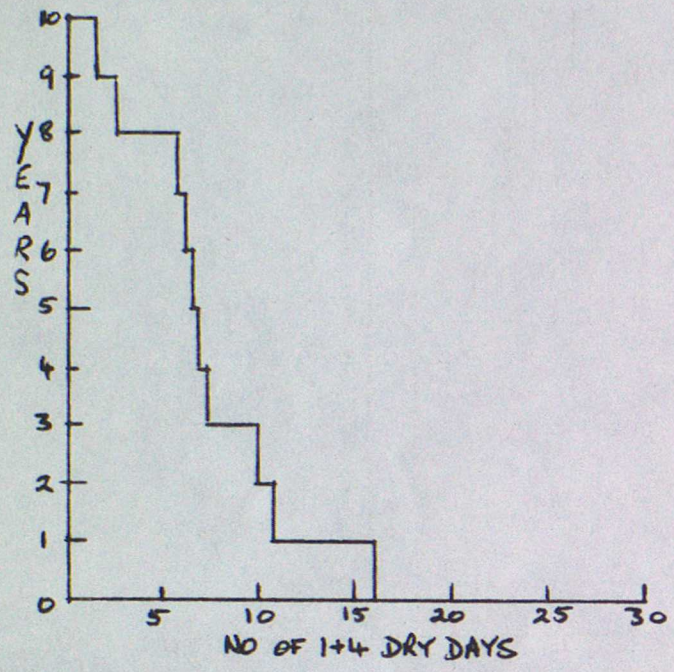



PERIOD 12/9 - 1/10

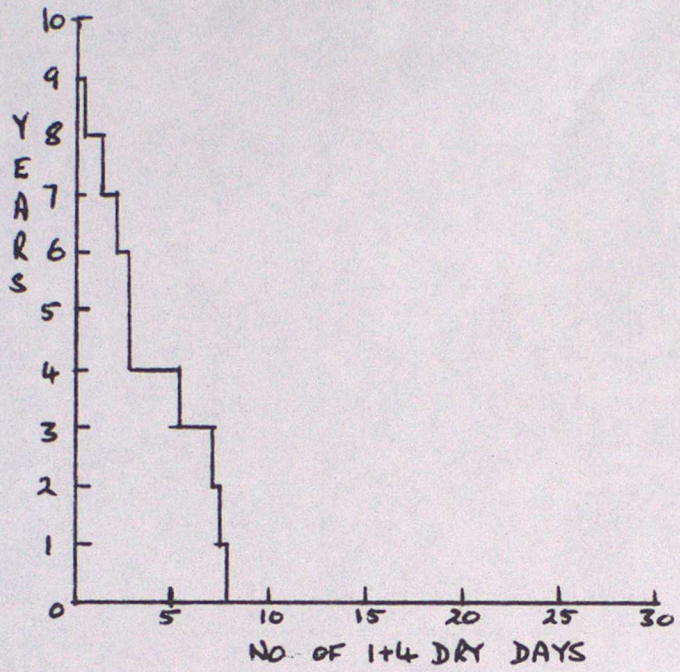


# 1+4 DRY DAYS FIGURE 10

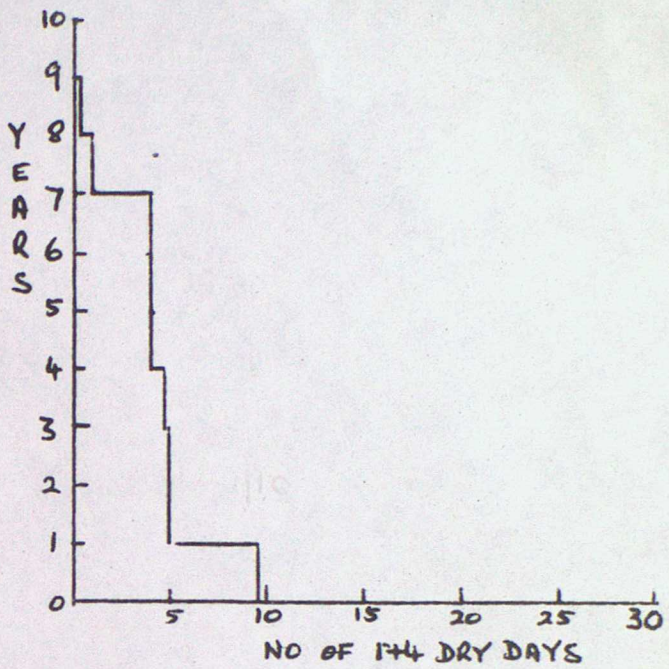
PERIOD 15/5 - 13/6



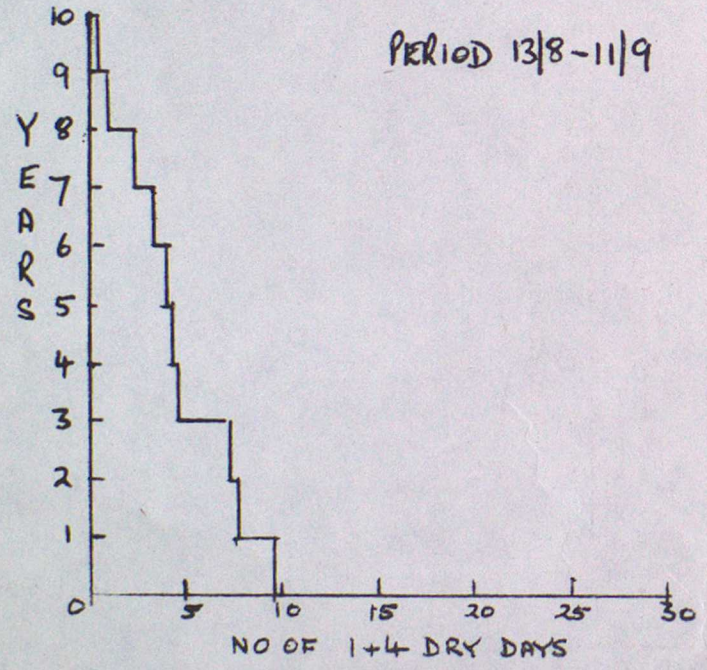

PERIOD 14/6 - 13/7




PERIOD 14/7 - 12/8




PERIOD 13/8 - 11/9




PERIOD 12/9 - 1/10